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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,773	05/04/2005	Mats Hedman	1509-1051	8225
466	7590	05/15/2007		
YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			EXAMINER ALI, HYDER	
			ART UNIT 3747	PAPER NUMBER
			MAIL DATE 05/15/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/533,773

Applicant(s)

HEDMAN, MATS

Examiner

HYDER ALI

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-23 is/are allowed.
- 6) ☒ Claim(s) 1,4,6,7,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 2,3,5 and 8-10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

- 1. Claims 1,4,6,7,11,12 are rejected under 35 U.S.C. 102(e) as being anticipated by Denger et al (US 6,615,771).**

**As to Claim 1, Denger et al discloses** a control method for the modulation of the torque of piston combustion engine that has a compression chamber of variable volume and operable inlet valves, characterized in that the torque requested for a predetermined operative condition is obtained through a selection of the volume of the compression chamber (**Denger et al discloses the effective compression ratio may preferably be adjusted by mechanically adjusting the geometric compression ratio and/or by means of a variable valve control system. See col. 3, lines 65-67 and col. 4, line 1**) combined with a selection of the time of opening (**Denger et al disclose a variable valve control system. See col. 4, line 1**) and the time of closure of the inlet valves combined with a selection of the frequency with which power strokes are performed (**Denger et al discloses operational range of the engine is allocated two-stroke and four stroke operational ranges. See col. 3, lines 45-50**).

**With regard to Claim 4, Denger et al** discloses the volume of the compression chamber is selected in combination with a selection of the times for opening and closure of the inlet valves as well as the outlet valves. **See col. 3, lines 65-67 and col. 4, line 1.**

**With regard to Claim 6, Denger et al** discloses power strokes are performed with early closure of the inlet valves. **Denger et al disclose a variable valve control system.**

**See col. 4, line 1.**

**With regard to Claim 7, Denger et al** discloses power strokes are performed with delayed opening of the outlet valves. **Denger et al disclose a variable valve control system. See col. 4, line 1**

**With regard to Claim 11, Denger et al** discloses 2-stroke cycles or 4-stroke cycles are selected upon a bases of the required torque, and that the power strokes are performed in 2-stroke cycles as well as 4-stroke cycles. **See col. 3, lines 45-50**

**With regard to Claim 12, Denger et al** discloses a control system with a computer program that, by signal control upon basis of a torque request from driver, selects frequency of power strokes, valve times, lifting of the valve, the volume of the compression chamber and operation with 2-stroke cycles or 4-stroke cycles. **See col. 4, lines 10-35.**

**2. Claims 1,4,6,7,11,12 are rejected under 35 U.S.C. 102(e) as being anticipated by Kaneko (US 6,619,242).**

**As to Claim 1, Kaneko discloses** a control method for the modulation of the torque of piston combustion engine that has a compression chamber of variable volume and

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operable inlet valves, characterized in that the torque requested for a predetermined operative condition is obtained through a selection of the volume of the compression chamber (**Kaneko discloses two-cycle operation mode in which an actual compression ratio is reduced. See col. 3, lines 40-44**) combined with a selection of the time of opening (**Kaneko discloses intake valve 6 and exhaust valve 7 are driven by variable valve timing mechanism 13a, 13b. See col. 3, lines 21-24**) and the time of closure of the inlet valves combined with a selection of the frequency with which power strokes are performed (**Kaneko discloses engine operational map is divided into three zones, a four cycle compression ignition combustion zone covering low and medium speeds areas and low and medium loads areas, a two cycle spark ignition combustion zone covering low and medium speeds areas and high loads areas, and a four cycle spark ignition combustion zone covering high speeds areas. See col. 3, lines 28-40**).

**With regard to Claim 4, Kaneko discloses the volume of the compression chamber is selected in combination with a selection of the times for opening and closure of the inlet valves as well as the outlet valves. Kaneko discloses intake valve 6 and exhaust valve 7 are driven by variable valve timing mechanism 13a, 13b. See col. 3, lines 21-24.**

**With regard to Claim 6, Kaneko discloses power strokes are performed with early closure of the inlet valves. Kaneko discloses intake valve 6 and exhaust valve 7 are driven by variable valve timing mechanism 13a, 13b. See col. 3, lines 21-24.**

**With regard to Claim 7, Kaneko** discloses power strokes are performed with delayed opening of the outlet valves. **Kaneko discloses intake valve 6 and exhaust valve 7 are driven by variable valve timing mechanism 13a, 13b. See col. 3, lines 21-24.**

**With regard to Claim 11, Kaneko** discloses 2-stroke cycles or 4-stroke cycles are selected upon a bases of the required torque, and that the power strokes are performed in 2-stroke cycles as well as 4-stroke cycles. **See col. 3, lines 30-50.**

**With regard to Claim 12, Kaneko** discloses a control system with a computer program that, by signal control upon basis of a torque request from driver, selects frequency of power strokes, valve times, lifting of the valve, the volume of the compression chamber and operation with 2-stroke cycles or 4-stroke cycles. **See col. 3, lines 30-50.**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**3. Claims 1,4,6,7,11,12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Denbratt (US 6,581,551) in view of Denger et al (6,615,771).**

**Denbratt discloses** a control method for the modulation of the torque of piston combustion engine that has a compression chamber of variable volume and operable

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inlet valves, characterized in that the torque requested for a predetermined operative condition is obtained through a selection of the volume of the compression chamber (See col. 3, lines 3-6) combined with a selection of the time of opening (See col. 3, lines 13-30) and the time of closure of the inlet valves.

**Denbratt does not disclose** a selection of the frequency with which power strokes are performed.

**Denger et al discloses** internal combustion engine that operate both in a two-stroke mode and in a four-stroke mode are well known. See col. 3, lines 27-30. **Denger et al also** discloses variable volume combustion engine operating both in a two-stroke mode and in a four-stroke mode. See col. 5, lines 1-30 and col. 6, lines 1-15.

**It would have been obvious** to a person having ordinary skill in the art to modify **Denbratt** by employing variable volume combustion engine operating both in a two stroke mode and in a four stroke mode as taught by **Denger et al** in order to provide **Denbratt engine** with variable volume combustion engine operating both in a two-stroke mode and in a four-stroke mode.

**The motivation to do so would** have been to combines the advantages of the designs of a four-stroke engine (such as: better lubrication, cooling, sealing, elimination of partial power losses due to the channel non-sealing etc) and of a two-stroke engine where the power output is theoretically two times higher.

**With regard to Claim 4, Denger et al** discloses the volume of the compression chamber is selected in combination with a selection of the times for opening and closure of the inlet valves as well as the outlet valves. See col. 3, lines 65-67 and col. 4, line 1.

**With regard to Claim 6, Denger et al** discloses power strokes are performed with early closure of the inlet valves. **Denger et al disclose a variable valve control system.**

**See col. 4, line 1.**

**With regard to Claim 7, Denger et al** discloses power strokes are performed with delayed opening of the outlet valves. **Denger et al disclose a variable valve control system. See col. 4, line 1**

**With regard to Claim 11, Denger et al** discloses 2-stroke cycles or 4-stroke cycles are selected upon a bases of the required torque, and that the power strokes are performed in 2-stroke cycles as well as 4-stroke cycles. **See col. 3, lines 45-50**

**With regard to Claim 12, Denger et al** discloses a control system with a computer program that, by signal control upon basis of a torque request from driver, selects frequency of power strokes, valve times, lifting of the valve, the volume of the compression chamber and operation with 2-stroke cycles or 4-stroke cycles. **See col. 4, lines 10-35.**

#### ***Allowable Subject Matter***

Claims 13-23 are allowed.

Claims 2,3,5,8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

Applicant's arguments, see pages 12-16, filed 02/20/2007, with respect to the rejection(s) of claim(s) 1-12 under 35 U.S.C. 103(a) have been fully considered and are



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persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Denger et al (US 6,615,771), Kaneko (US 6,619,242) and Denbratt (US 6,581,551).

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HYDER ALI whose telephone number is (571) 272-4836. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Kirk Cronin can be reached on (571) 272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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STEPHEN K. CRONIN  
SUPERVISORY PATENT EXAMINER